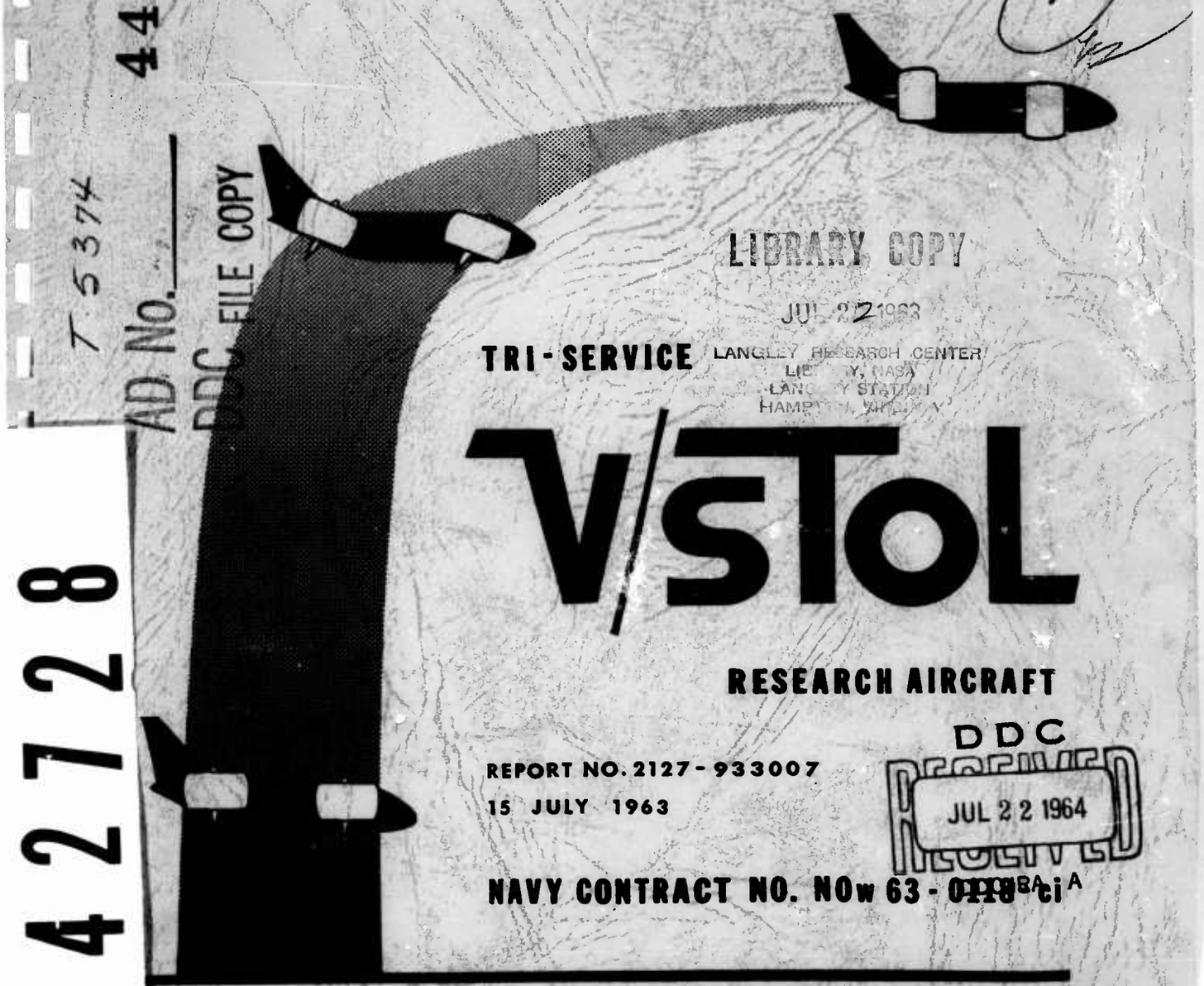
X-22A PROGRESS REPORT NO. 7

JUNE 1963



TRI-SERVICE

V/STOL

RESEARCH AIRCRAFT

REPORT NO. 2127-933007
15 JULY 1963

NAVY CONTRACT NO. NOw 63-0118-d

BELL AEROSYSTEMS COMPANY
DIVISION OF BELL AEROSPACE CORPORATION-A textron COMPANY

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BELL AEROSYSTEMS COMPANY

X-22A TRI-SERVICE V/STOL AIRCRAFT

MONTHLY PROGRESS REPORT

Report No. 2127-933007

June 1963

This is the seventh Monthly Progress Report as required in Section F(5) of the contract, and outlines progress for the period 1 June 1963 through 30 June 1963.

A. J. Marchese
Project Director
X-22A PROGRAM

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I. INTRODUCTION

Bell Aerosystems Company was awarded Contract NOw 63-0118-ci by the Department of the Navy, Bureau of Naval Weapons for two Model X-22A Tri-Service V/STOL aircraft. The official negotiation contract was authorized on 30 November 1962. The X-22A aircraft is a dual tandem ducted propeller research airplane (Figure 1), with a prime mission of exploring the mechanical and aerodynamic problem of an aircraft designed and constructed for both vertical takeoffs and landings and conventional type operation. It carries a flight crew of two men in the cockpit, a pilot and copilot, and is capable of carrying a nominal 1200-pound payload. The aircraft will be designed to a target value for weight empty of 10,635 pounds, a speed of 303 knots, and endurance of 1.09 hours.

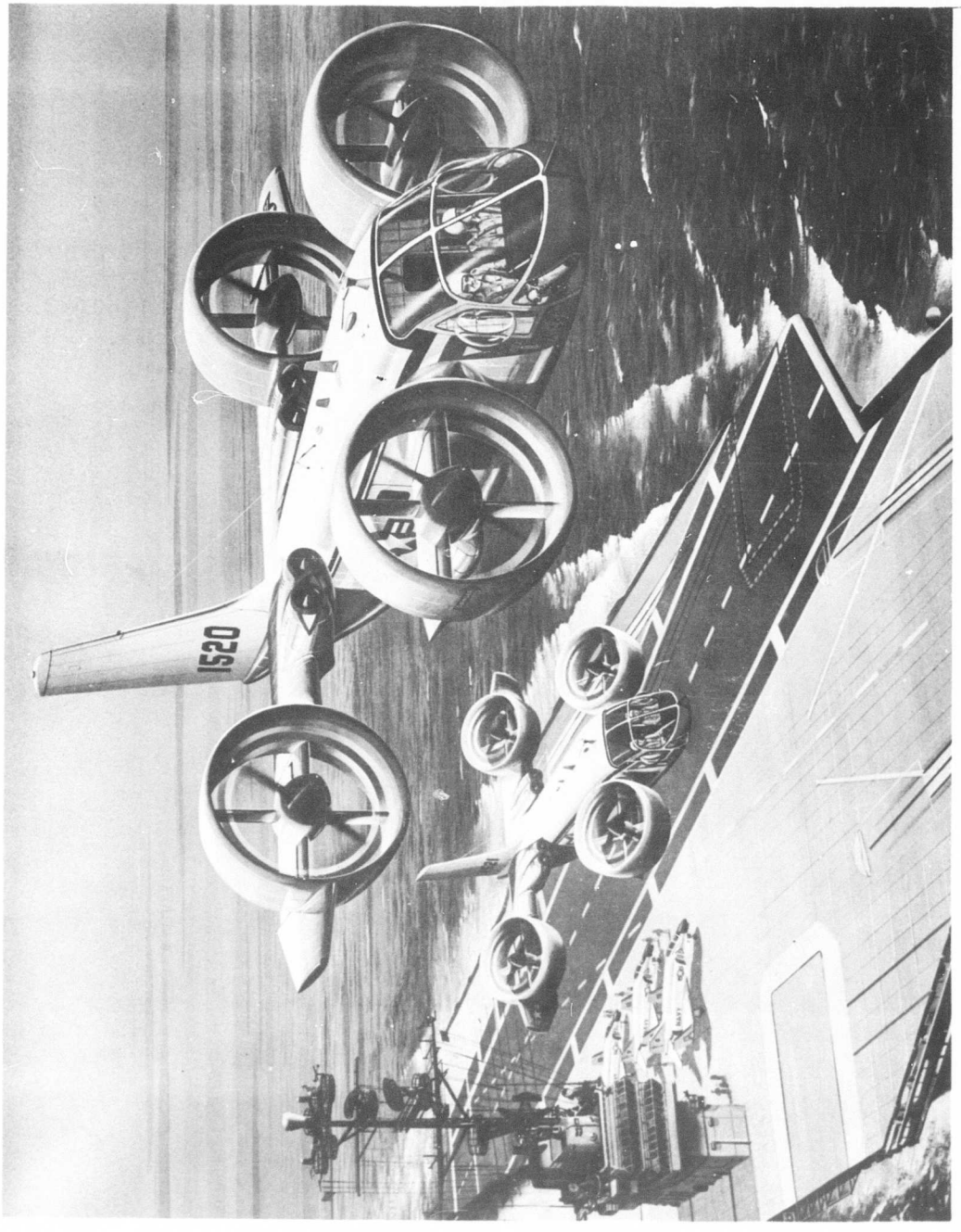

Figure 1. X-22A Tri-Service V/STOL Aircraft

II. SUMMARY

Final design resolutions are being made which incorporate revisions required for the improved longitudinal and directional stability. Flight control system design weight has been established. Further weight control studies are continuing.

Wind Tunnel model tests have been resumed on the 1/5 scale powered model and are continuing with modified controls. The second series of tests on the 1/6 scale unpowered model were started.

Testing of Wing Compression Test Panels has been started. Assembly of Duct Noise Test and Fuselage Shear Test Specimens in work for July tests.

Subcontractor coordination, review meetings, technical visits, and PERT scheduling have continued. Finalization of all subcontracts during the month of July is anticipated. Proposal date for Landing Gear Systems has been extended to 19 August.

During the June period, all contractual reports and data requirements were completed essentially as scheduled. No hardware was scheduled for delivery.

Management controls of PERT scheduling and costing continued. The fourth PERT Cost Report, PERT Milestone Computer report and PERT Interim report for the month of May were all submitted to BuWeps during June.

Progress between 1 June and 30 June 1963 has continued in the detail planning of all program efforts. In PERT schedules we have revised all of the original top level nets into expanded detail nets. All networks have been updated as of 28 June 1963.

Budgets in line with negotiated costs through June 1963 have been issued and are being used by each operational department. Daily reviews of these budgets are being made and expenditures through 30 June 1963 are within the authorized funds for this period. The authorized direct labor hours for each net, through the use of the PERT/COST EDP run, are released as the operating official hours to each department as each detail net is completed.

Figures 2 and 3, X-22A Milestone Data Requirements Charts, for the 2nd and 3rd Quarters of 1963, and Figure 4, Program Schedule, reflect the program and status as of 30 June 1963.

All operating departments are continuing with necessary planning and interdepartmental coordination as required, spearheaded by a weekly meeting attended by all members of the X-22A Management Organization.

The Engineering and Manufacturing weekly meetings to discuss and review designs, techniques, specifications, equipment, etc., are continuing. Weekly top management program reviews are being held.

Bell Aerosystems Company will shut down all operations for a two week vacation period from August 3rd through 18th, 1963. Only those necessary tasks requiring coverage during this period will be provided for. Contractual data items due for submittal to BuWeps during this vacation period are being rescheduled to be delivered prior to the shutdown.

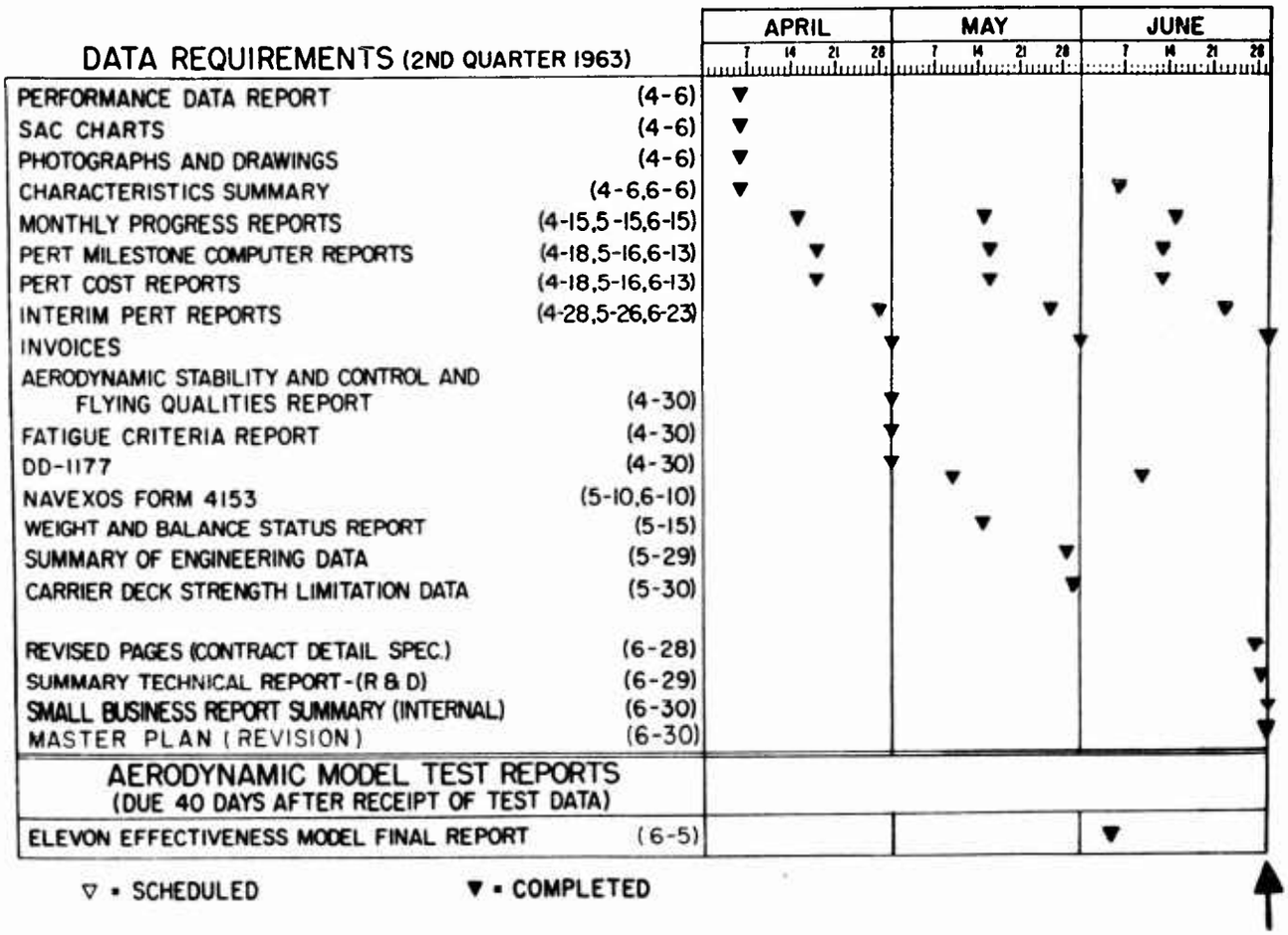

Figure 2. X-22A Milestone Chart - Data Requirements
(Second Quarter)

X-22A MILESTONE CHART

BELL AEROSYSTEMS COMPANY

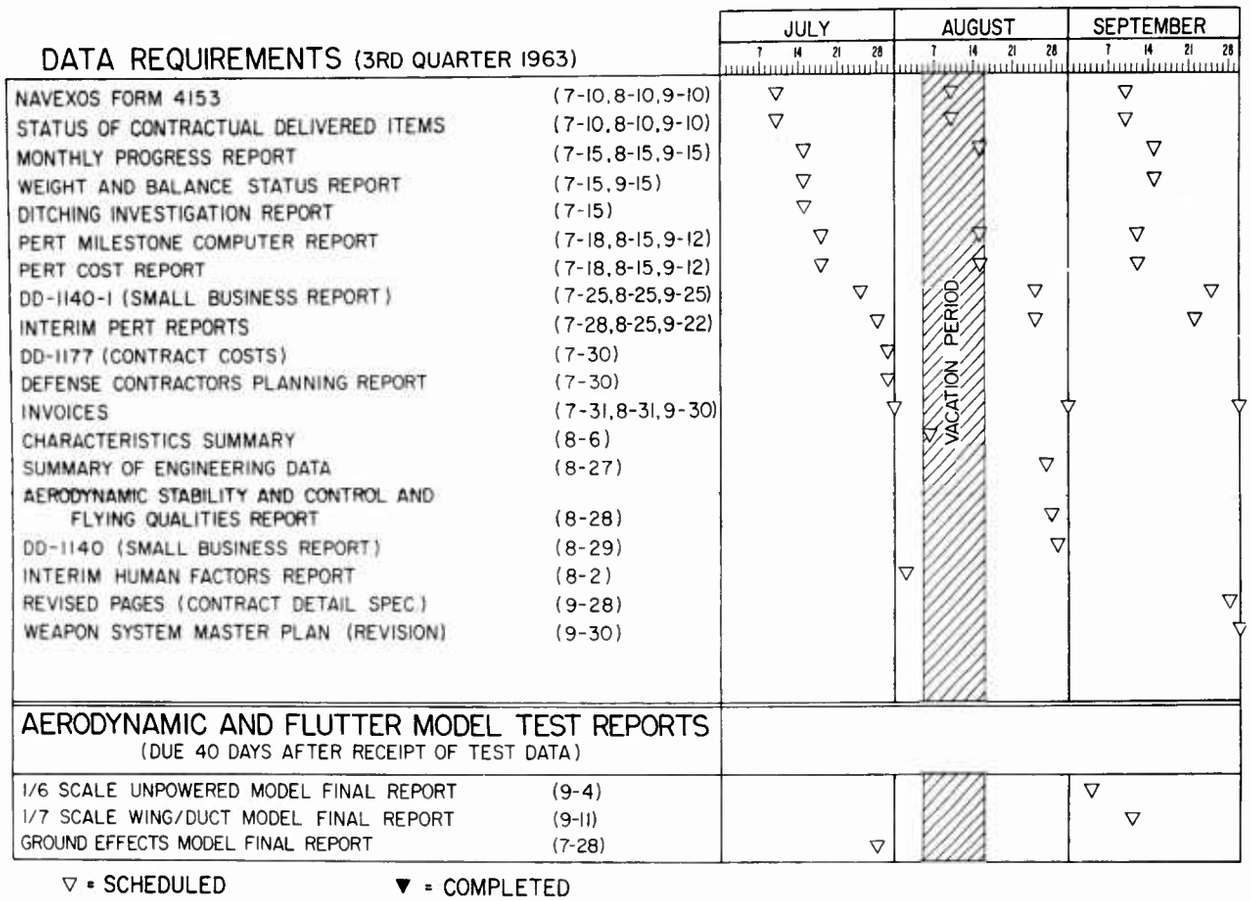

Figure 3. X-22A Milestone Chart - Data Requirements (Third Quarter)

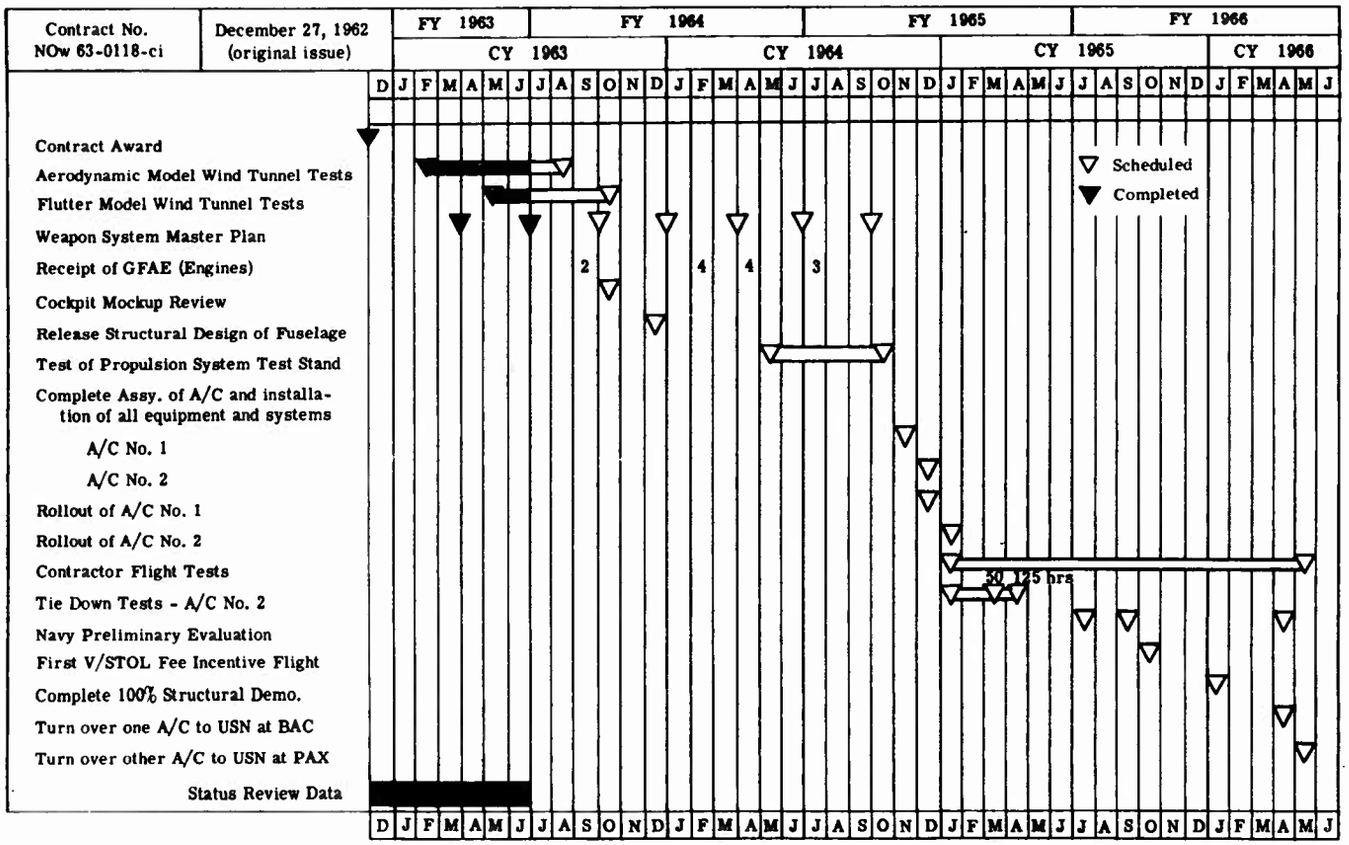

Figure 4. Program Schedule

III. PRELIMINARY DESIGN

A. FLIGHT TECHNOLOGY

1. Performance

The revised Characteristics Summary reflecting the current configuration was delivered to BuWeps. The SAC Charts and Characteristics Summary were incorporated into the Performance Report at the request of BuWeps.

Analyses were made to determine maximum speed penalties for use of various types of skin joints and rivets on the airplane components.

2. Propulsion Analysis

Approval of the new propeller blade configuration was granted Hamilton Standard since static and low speed thrusts remained essentially at the same level. New efficiency map and correction curves were received and a review of guarantees, blade travel, and control effects is in process. Estimate of propeller velocity distribution for flight along limit transition boundary is about 75 percent complete.

A preliminary issue of forces available from propeller pitch change was made and a reevaluation is currently in work.

The internal drag decrease for cambered and twisted duct struts and elevon leading edge did not justify the increased complexity when compared to the symmetrical sections. Hamilton Standard estimated swirl angles were used in this analysis. No leading edge stall is predicted.

A summary of power losses and extractions is being compiled. No serious discrepancy with the proposal is apparent.

The nacelle longitudinal and peripheral skin temperature distribution for hover and maximum speed conditions was estimated using improved methods and latest engine heat rejection data.

3. Stability and Control

a. Loads

Aerodynamic loads on the various components have been revised and reissued. These reflect the latest configuration changes and are based on results of the DTMB tests of the 1/6 scale model.

Analog computer studies of rolling pullouts have been performed in support of analyses pertinent to structural design.

b. Control

Elevon and propeller blade angle phasing with duct angle has been revised and analyses to determine the resulting control levels and cross coupling effects have been initiated.

Bell test data on elevons is being studied in detail to verify effectiveness and design hinge moment predictions.

c. Variable Stability, Cornell Aero Lab

Cornell Aeronautical Laboratory has been given the data to initiate their dynamic studies in transition. Close coordination is being maintained to insure that CAL is presented with the latest required data and is aware of all Bell efforts on related stability and control studies.

Cornell will use their main analog computer facilities as part of the VSS study program. It has been agreed that Cornell will furnish components for mating of the Bell analog equipment and VSS equipment, thereby providing test capability of control system, variable stability-pilot combination.

B. VEHICLE STRUCTURES

1. Criteria and Loads

Rolling pullout loads have been determined for an elevon lateral deflection of 7° at 365 knots. The resulting elevon loads when combined with existing longitudinal trim loads are large. Means for limiting elevon travel at high speed are being investigated.

Landing gear strokes have been reduced from 10 to approximately 9.2 inches in order to prevent maximum loads from occurring near maximum strut closure. As a result of this change, landing gear loads have increased approximately 20 percent.

The problem of duct stall has been reviewed with the propeller system subcontractor. Two different degrees of duct stall are to be investigated by the subcontractor to determine the magnitude of the blade loads involved. Since it is not yet certain that duct stall will be encountered by the X-22A, static strength alone is being required for blade design.

2. Structural Analysis

a. Front and Rear Ducts

The idealized structural model in the IBM program for evaluating torsional and bending deformations is being modified so that interface loads at the bolted attachment of the gearbox to the aft center body section can be obtained directly.

Deformation studies of both forward and aft ducts is proceeding for the latest loading conditions. At present, the forward duct is being analyzed for the high speed gust condition, and the aforementioned rolling pullout maneuver condition is being used in the analyses of the aft duct. This latter condition appears to be critical for the aft duct.

b. Wing and Duct Support Structure

Detail stress analysis of the outboard bearing support fitting has been completed for both the rolling pullout and high speed, with negative gust, flight conditions. Based also on these conditions, the duct support tube wall thickness, bearing support, and reinforcing ring have been established. Detail design and analysis of the stop ring at the inboard bearing location for the aft duct was also completed.

Six representative wing cover panels for compression tests have been fabricated and are being prepared for testing (Figures 5 and 6). Short lengths of the stringer extension were tested and the results verified the predicted value of the allowable compressive crippling stress.

c. Stabilizer

The structural arrangement of the stabilizer was completed for the revised reduction in surface area. A statically determinate attachment load configuration is being used as this arrangement coincides conveniently with the hard points in the aft duct structure.

d. Fin

Shears, bending moments, and torques have been calculated for the latest fin configuration. Consideration has been given to the elimination of the additional safety factor, since the present plan is to static test the fin to ultimate load. Section property and shear flow analysis are now in progress to establish the basic skin-stringer panel thickness and geometry.

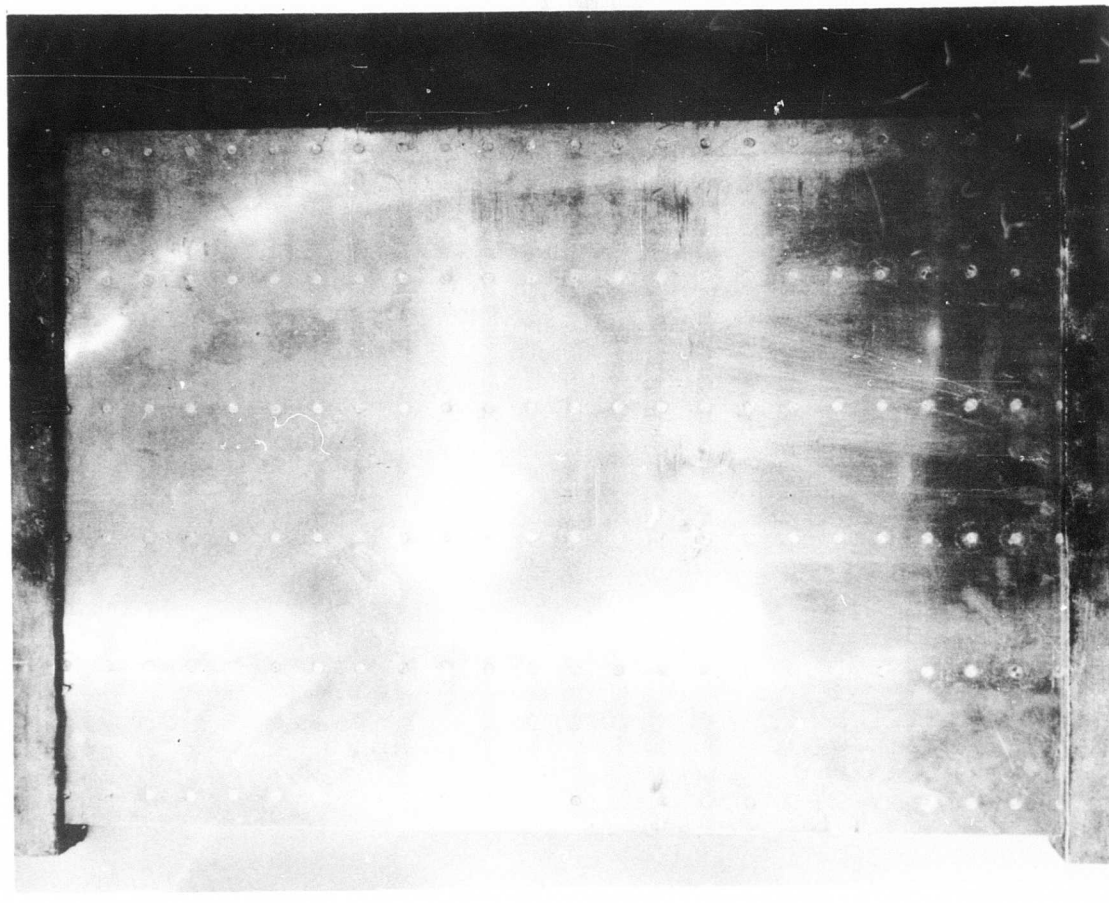

Figure 5. Wing Compression Test Panel - Top View

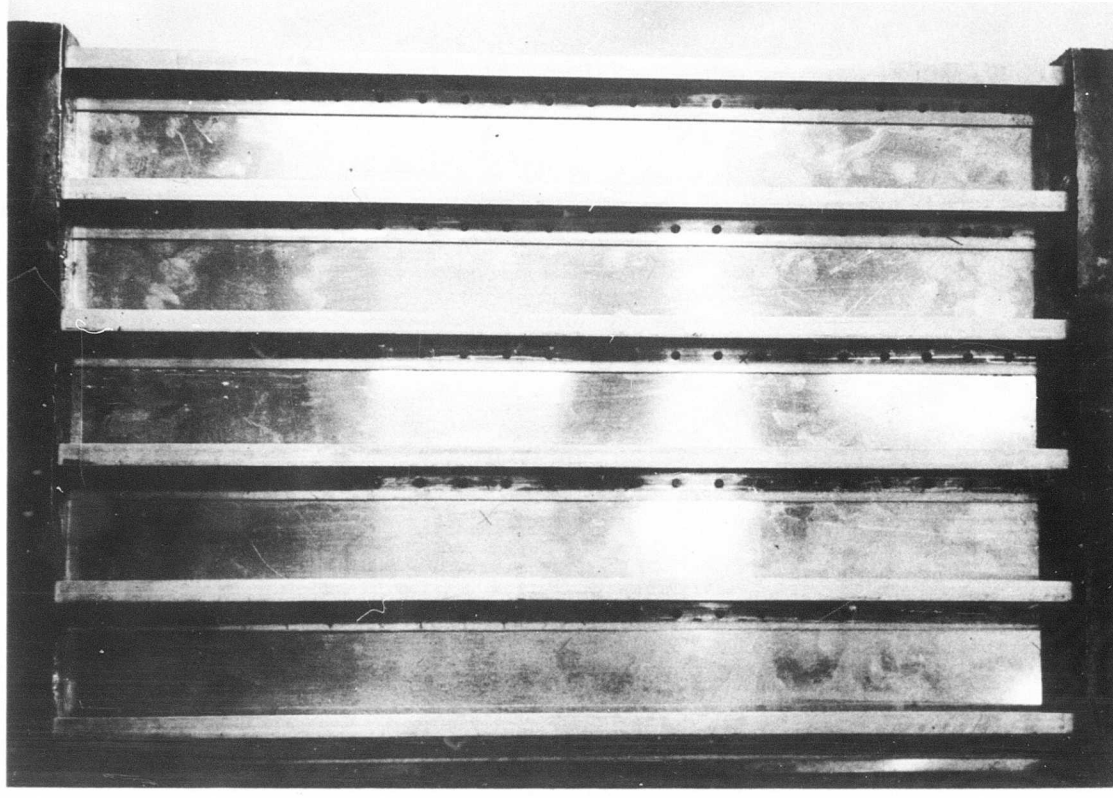

Figure 6. Wing Compression Test Panel - Bottom View

e. Fuselage

The inboard bearing support for the forward ducts was investigated and is to be fabricated from 18 percent Ni. maraging steel, similar to that used in the outboard bearing support. Hoist fittings for the aircraft have been incorporated into the structure at convenient major bulkhead locations at the forward outboard bearing support and at the Station 361 main landing gear bulkhead.

The nose wheel well beams were extended to the forward duct support frame at Station 210, and the material of the cargo floor was changed from .040 – 2024-T3 aluminum alloy sheet to the same gage of AZ 31B-H24 magnesium alloy sheet in the weight control program.

f. Transmission System

Layout drawings of propeller, engine and forward gearboxes were reviewed. Tentative average fatigue strength levels for steel shafting and magnesium castings were selected and forwarded to vendors for information. Statistical analyses are being conducted to obtain 90 percent probability limits for steel shafting. A method for determination of fatigue reduction factors due to notches was defined and forwarded to vendors for information. Studies of correction factors to be used for size, surface finish and conversion of bending allowables to torsional allowables are in progress.

3. Aeroelasticity

Flutter analyses are continuing for both symmetric and antisymmetric modes. At the present time, the most significant flutter mode is a symmetric mode in which the aft wing couples with fuselage rigid body pitching and vertical translation. Confirmation of this mode will be sought

in the DTMB flutter tests in July. An increased stiffness requirement for the aft wing structural box may be indicated. Other flutter modes indicated by flutter analysis are more than 15% higher than the limit dive speed.

4. Weights

Weight and Balance Status Report No. 3 is being prepared. The current weight empty is 10,890 pounds, which is approximately 113 pounds higher than reported in the last monthly report. The major area of weight increase is in the flight controls group where detailed system analysis has taken place and an overweight of approximately 200 pounds is incorporated. Additional increases in duct and support structure and in the wing were incorporated as a result of redistribution of design loads.

Reductions were possible through: (1) removal of the design factor on fin and engine mount components which are now to be static tested; (2) changing the cockpit and cabin flooring from bondolite sandwich to magnesium as shown on layout 2127-158001 submitted for BuWeps approval; (3) use of magnesium skins and ribs on the elevons; (4) correction for exterior finish weight inadvertently included before; (5) incorporation of electronics equipment for which BuWeps approval is pending; and (6) electrical system concept changes also submitted for BuWeps approval. All of these changes are being explained in the forthcoming weight status report.

Areas of current study include continued efforts to reduce the flight controls group overweight and use of close tolerance fiber glass laminates in nonprimary structural applications.

C. DESIGN

1. General

As a result of the configuration, and tradeoff studies as described in last month's report, weight additions became apparent. Therefore, this

month was concerned with a maximum effort on weight control. Work on a revised Inboard Profile drawing has been started and is well underway.

2. Airframe

a. Lines

Full scale sections of the entire fuselage have been completed and issued to the mold loft for printing. Full scale lines of the engine nacelle have been completed and sent to the loft for printing. Full scale sections of the canopy framing have been completed. Lines of the main landing gear fairing have been completed and are being reviewed by all concerned. A lines investigation of the windshield area is underway.

b. Ducts

An undimensioned drawing of the complete rib system has been prepared. Layout studies of the horizontal strut to duct rear beam has been made. Studies are being made on the attachment of the vertical strut to the center body. Several design studies of the duct support tube and fittings have been made and are being evaluated. Investigations of the compound elevon and vane system is in process. Layouts of the fully machined forward beam have been started. Final detail undimensioned drawings of the rear beam are in process. An ABM ordering the sheet stock for the duct has been completed. Coordination layouts of the center body are nearing completion.

c. Wing

Detail drawings of the outboard support fitting are underway. Layouts of the inboard duct support is continuing.

d. Fuselage

The cockpit area including the framing, longitudinal members, canted bulkheads, canopy, and canopy latching is well underway and in some areas is in the detailing stage. Main gear fittings are complete and the framing of the bulkheads is in work. The duct rotation support fittings are being revised due to latest wind tunnel data.

Master plaster model for forward fuselage is in work (Figure 7). Master templates are in work for aft fuselage model.

3. Flight Controls and Equipment

a. Flight Controls

An intensive weight survey of this system resulted in several changes. Included are several areas where push pull rods replace cables, rerouting of these rods to eliminate several bellcranks and the use of light-weight rod ends.

A study of an unimproved input at the propeller gearbox has been started. Hamilton Standard was visited on 7 June to review their designs of this control. Suggested changes were made to them and layouts of our inputs will be submitted to them. The layout of the duct rotation harmonic drive system has been completed and sent to United Shoe Machine Co. for a preliminary engineering stress analysis.

The final layouts of the elevon and differential pitch mixing levers have been completed. Detailing of mixing levers has been started.

The final design layout of the swash plate has been started. The motion and load schematics in the cockpit area have been completed. The final design layout of the duct rotation power unit gearbox has been started. Final design layout of duct rotation brake has been started.

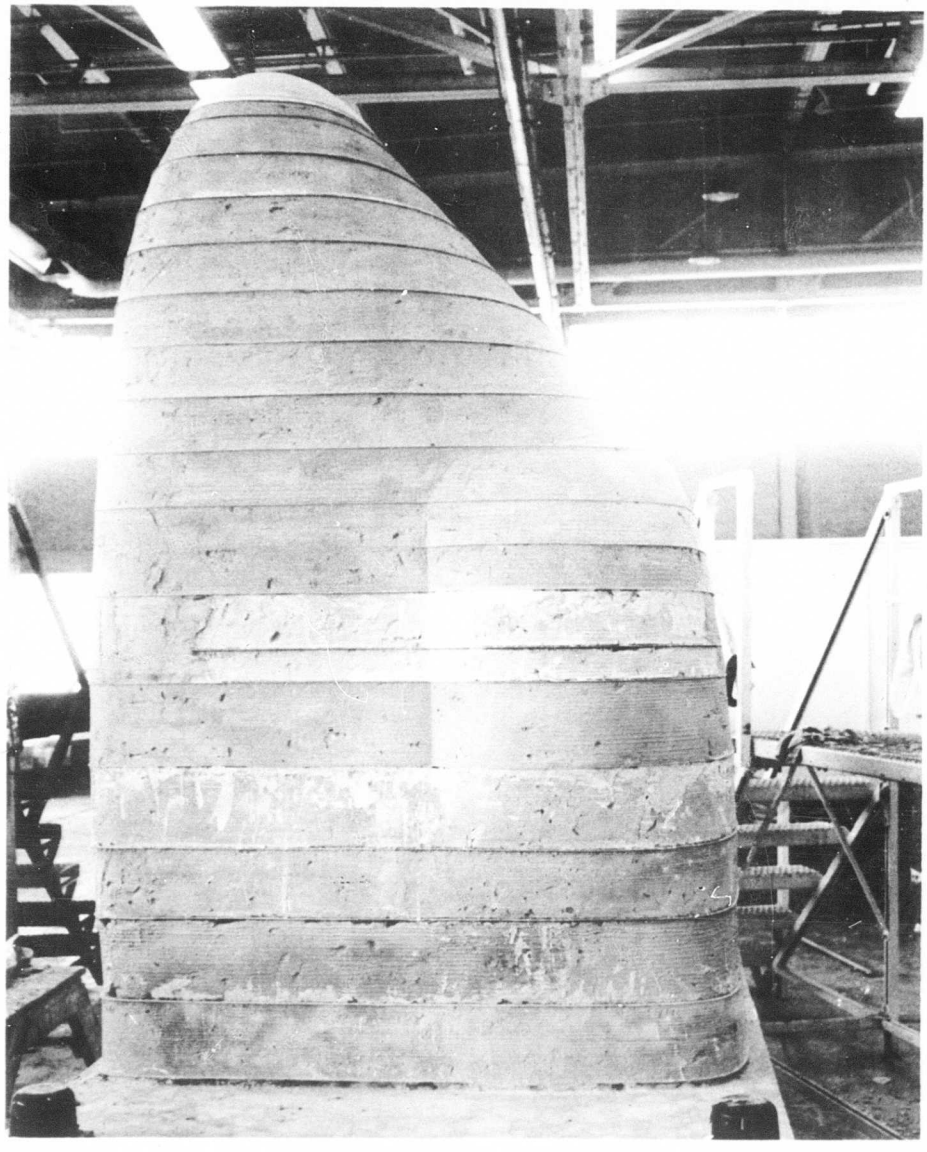

Figure 7. Forward Fuselage Master Plaster Model

b. Fixed Equipment

A preliminary pilot's check off list has been prepared and issued for comment. A survey of heater manufacturers is underway to meet X-22A requirements.

4. Propulsion

A tentative arrangement of the fire detection routing was established in conjunction with the Walter Kidde Co. Evaluation of fuel tank bladders and supporting structure is underway. Detail structural design layouts of the engine out inlet and starter covers have been started. The propulsion test stand program is presently being revised to incorporate the review changes. The Spec Control Drawing of the oil cooler is underway.

5. Electrical and Electronic

A specification is in process to define the requirements of the Lycoming Constant Speed drive. Studies have been made on the wire routing across the duct rotation joint. The layout of the equipment in the accessory gearbox area is almost complete. A layout of the landing gear light has been completed. A layout for installing the remote compass transmitter in the fin is underway. An updating of the preliminary load analysis is in work.

6. Landing Gear and Hydraulics

Revisions to the landing gear geometry and the hydraulic system schematic have been completed and are ready for submittal to BuWeps. Several layouts of the double hinge elevon actuators have been made and are being evaluated on the basis of weight and accessibility. A Spec Control Drawing has been started on the normal elevon actuators.

D. SYSTEMS SUPPORT

1. Human Factors Section

Simulation planning and analysis undertaken in May indicated that a cockpit simulator which incorporated the control feel characteristics of the X-22A is required to properly evaluate pilot capabilities in control activities to that type of aircraft. During this report period, a specification for a cockpit simulator embodying these and other characteristics of the X-22A was prepared.

A review of comments and recommendations by Navy personnel after their May visit, and of data and recommendations resulting from Human Factors analysis was accomplished. As a result, certain revisions in cockpit layout and control-display arrangement were recommended which are described below:

(1) For the purpose of cockpit arrangement instrument location favors piloting from righthand seat. This does not preclude flight control from either side.

(2) The main instrument panel display arrangement will provide for functional grouping as determined by V/STOL control functions rather than conventional aircraft or helicopter grouping.

(3) The center console was rearranged to improve location of throttle and landing gear controls and access, both visual and manual, to the annunciation panel and switch panels. A general improvement in this area resulted.

2. Maintainability and AGE Section

A review of progress in each of the design sections has been made to keep abreast of the latest development. Reanalysis of access openings into the accessory compartment has been made as a result of newly dimensioned equipment and relocation of system components.

E. SUBCONTRACTS

1. Propellers - Hamilton-Standard Division

Design effort progressing. Review and technical meetings are being held to clarify design areas, and to coordinate efforts. Definitization of subcontract is dependent on a few items which are scheduled for prompt finalization.

PERT Time system has been instituted effective through delivery of the first hardware (May 1964). The initial network and print-out due in July.

Support of 1/3 scale Wind Tunnel Duct and Prop Model testing was authorized. This model testing, at DTMB, will begin in mid July.

Prop Duct assembly in work at BAC. Elevon assembly and struts also progressing.

Engines, with power control for propeller test stand use have been requested of BuWeps. We have received verbal confirmation, but no formal acknowledgement at this writing.

2. Variable Stability System - Cornell Aeronautical Laboratories

Progressing on schedule in design and specifications efforts. Quality Control compliance has been established. PERT Time requirements are being met and personnel of Cornell have been instructed in the PERT system details.

Contract finalization is scheduled by mid July. An estimate, for an addendum to the contract, encompassing environmental tests for the VSS components is being prepared.

3. Transmission and Gearbox System - Steel Products Engineering Company

Review meetings have coordinated design requirements and PERT time schedules. Areas of negative slack have been reduced to zero, program is progressing satisfactorily to date.

The contract is expected to be finalized within the next month.

4. Ejection Seats - Douglas Aircraft Co.

Approval is still restricted to mockup use. Seat rails were received and the seats, with color change approved, are to be shipped from Douglas Aircraft Co. 22 July.

The two sets of parachutes and torso harnesses were shipped by BuWeps direct to Douglas.

5. Landing Gear - Out for Bid

Due to pressures of other business, prospective bidders have requested extension of time for submittal of proposals. Bid proposal due date has been extended to 19 August.

6. Duct Rotation System - Under Study

United Shoe Machinery has been requested to submit a proposal for an engineering stress analysis program.

Bid requests have been solicited for duct rotation shaft fabrication and milling.

7. Right Angle Gearbox for NASA-AMES Duct/Propeller - York Gears Ltd.

Design review meetings have resolved all problems. Work progressing on schedule.

IV. MODELS

A. WIND TUNNEL TEST PROGRAMS

1. 1/6 Scale Unpowered Airplane Model

The second series of tests of this model was delayed until June 26 by a higher priority program at DTMB. During this series, variation of surface incidence settings and component breakdowns will provide drag, air load and stability and control information.

Modified components were incorporated on the model prior to tests.

2. 1/5 Scale Powered Airplane Model

Testing of this model at the NASA Langley Research Center 7 x 10 foot Wind Tunnels started June 10 and will run approximately four weeks. The purpose of this test series is to obtain stability and control data (with the effects of power to the propellers) through the transition flight range from hover to level flight.

Attention also is being given to the flow problems around the airplane. The model has been tufted and wand surveys also are being made. With these, the stalls of the various surfaces and the vortex patterns are being noted and should give insight on surface incidence settings and surface puncture filleting and fairing.

Lip stall has been environmental on the lower inside lips of the ducts when tilted at high angles (early VTO transition condition). This is accepted as a model problem (low Reynolds number) and not anticipated on the full-scale airplane. Modified duct inlets were installed during the test period.

3. 1/3 Scale Powered Duct Model

A pretest conference was held at DTMB and the proposed program reviewed and streamlined to reduce the test time required. The duct fabrication will be completed about July 1 and will require two weeks to calibrate. The propeller blades will be completed about July 15 and testing is expected to start immediately thereafter.

4. Full-Scale Powered Duct Model (See Figures 8-11).

Detailed design of this model is in progress. Gearbox layout drawings are being reviewed for approval. Manufacturing has completed the duct outer skin. Vertical and horizontal strut skins are in work.

5. Elevon Effectiveness Model

The data report for tests of this model were submitted to BuWeps.

6. Free Flight Model

NASA has indicated that this model may not be completed until October due to higher priority programs and the delay caused by changes in X-22A configuration.

7. 1/20 Scale Spin Model

Fabrication of these models is progressing satisfactorily at DTMB.

8. 1/7 Scale Duct/Wing Flutter Model

Testing is presently scheduled to start at DTMB during the week of July 15 - 20. Model manufacture is complete and model checks and calibrations will be completed during the first week of July. Model shipment to DTMB will be accomplished during the second week of July. The model and tentative test program are described in Bell Report No. 2127-941040.

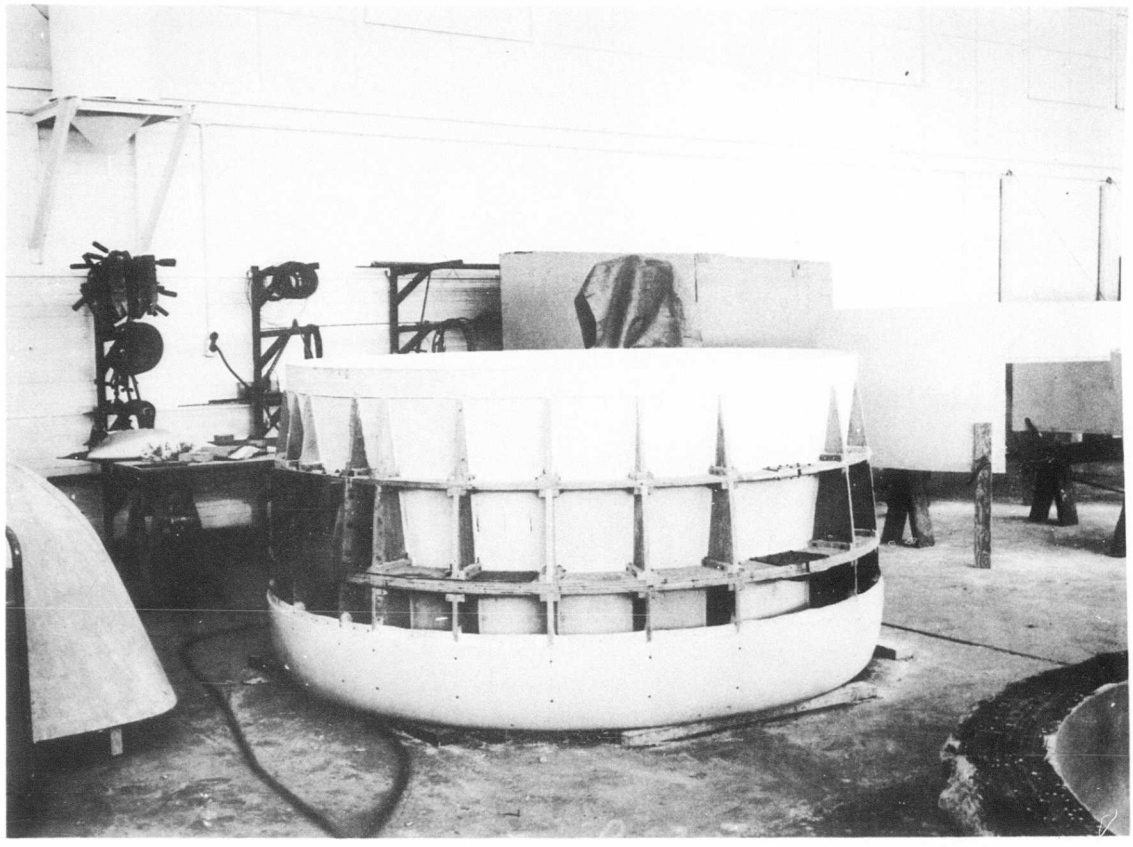

Figure 8. Vendor and Test Stand Duct Assembly

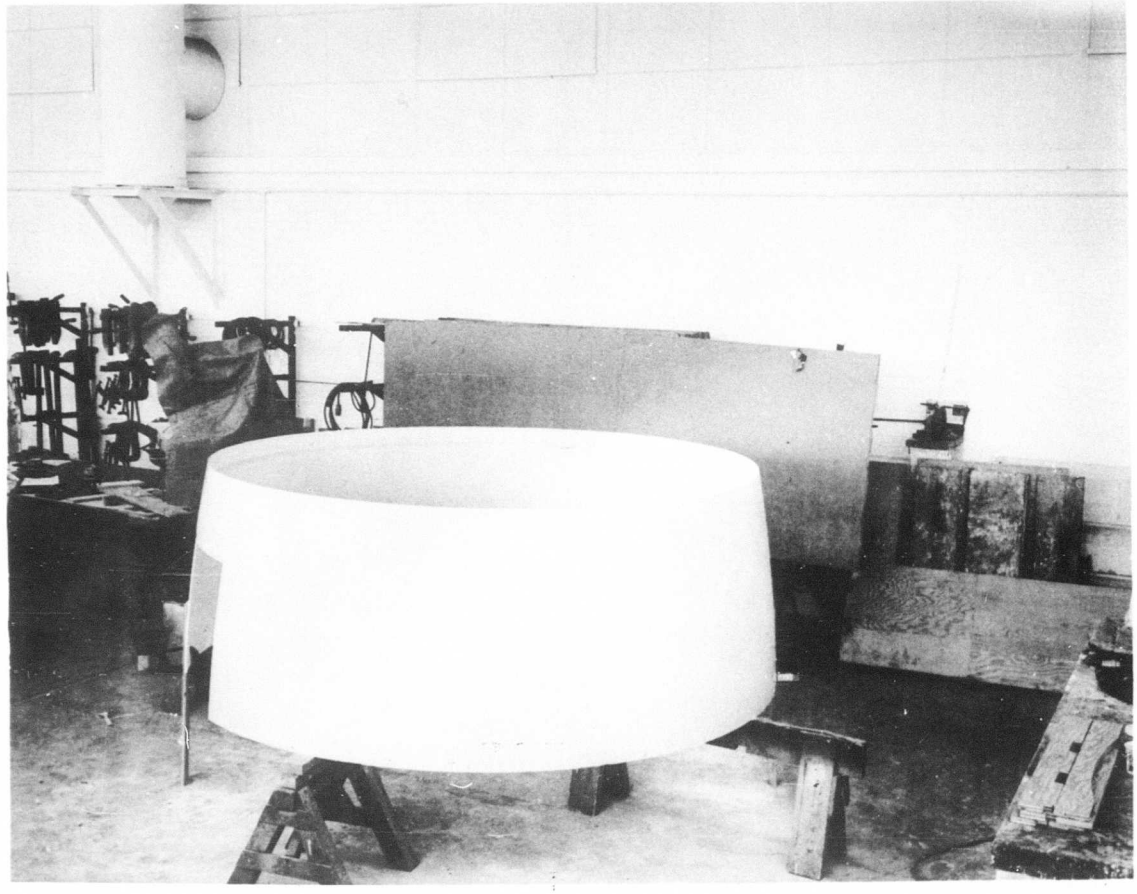

Figure 9. Outer Skin for Vendor - Test Stand Ducts

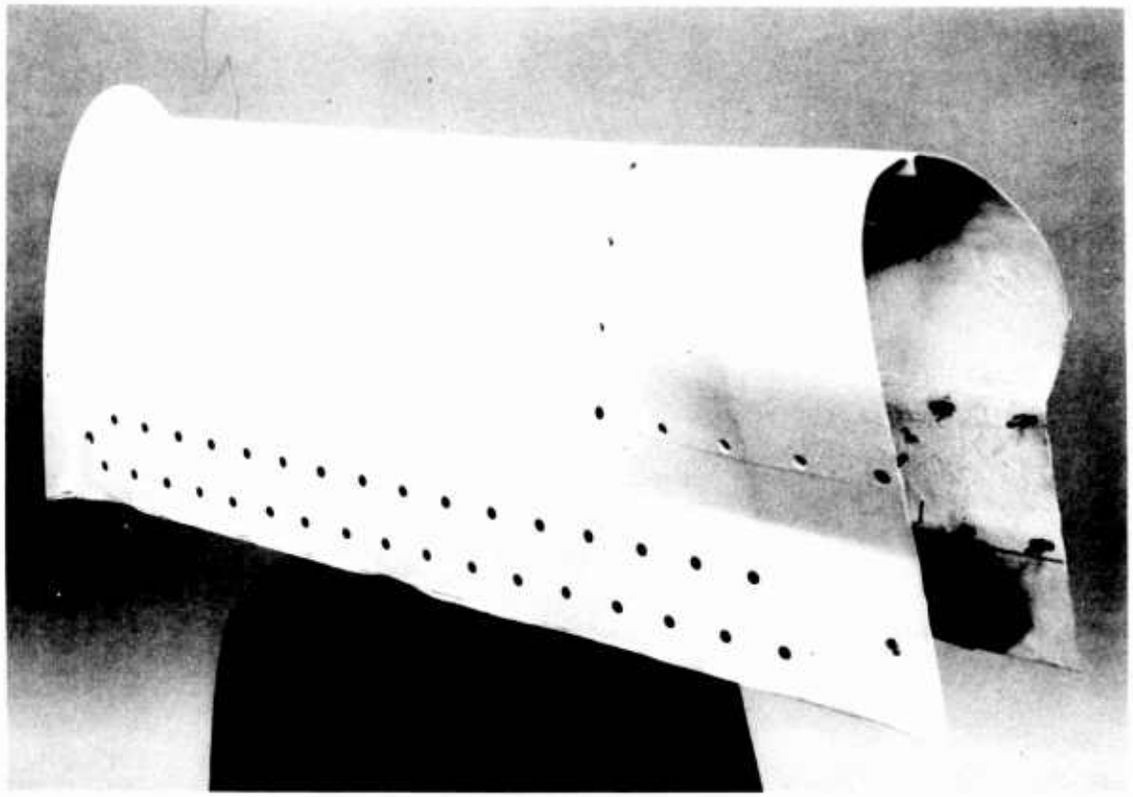

Figure 10. Horizontal Strut Skin for Vendor - Test Stand Ducts

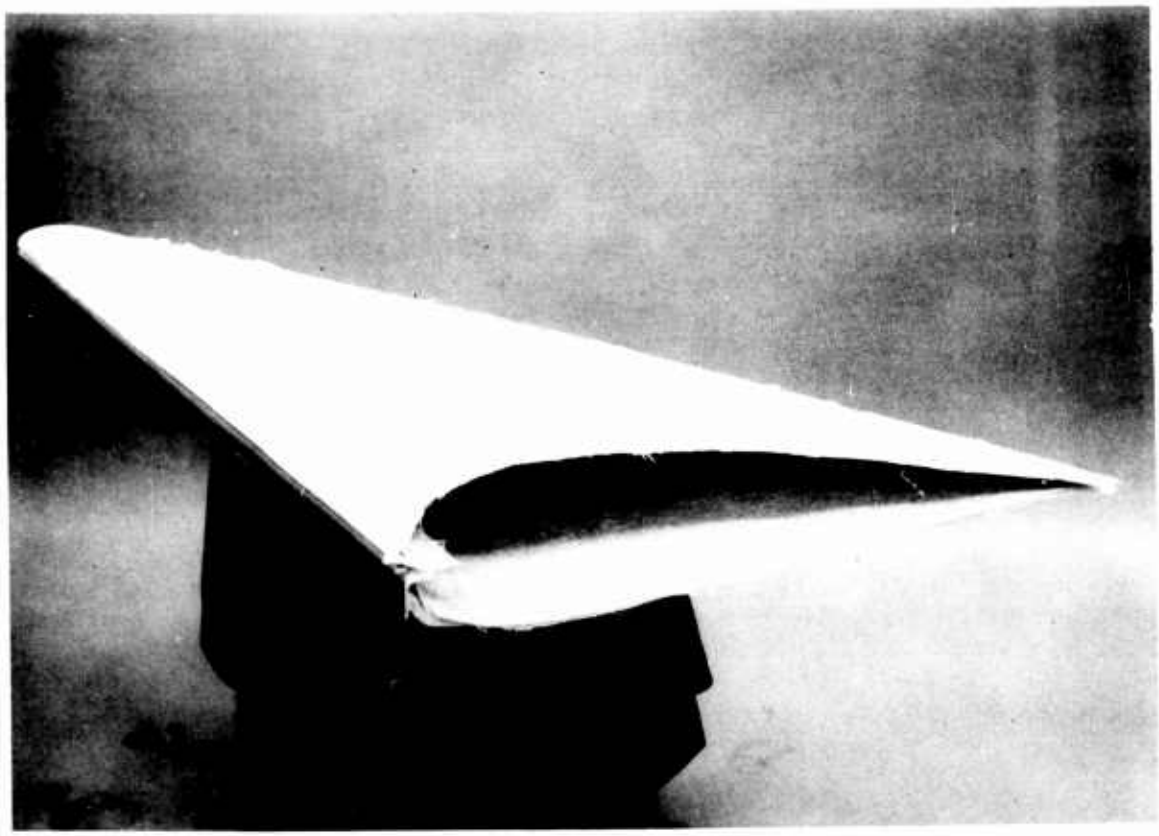

Figure 11. Vertical Strut Skin for Vendor - Test Stand Ducts

9. 1/7 Scale Complete Flutter Model

The complete flutter model will be ready for test on July 15, so that preliminary checks may be made on the complete configuration during the July test period. Complete tests will be accomplished during the scheduled test period in September. The early checks will allow time for any required model or mount modifications to be made before the second test period occurring in September. This should provide optimum test results during this second period.

10. Ground Effect Model (See Figures 12-14).

Testing of this model was completed and a data report is being written

11. Wind Tunnel Facilities

The rescheduling of tunnel facilities of the X-22A Wind Tunnel Model Test Program at DTMB and NASA Langley has affected BAC design effort. It has been necessary to slip the confirmation of detail designs to later program periods.

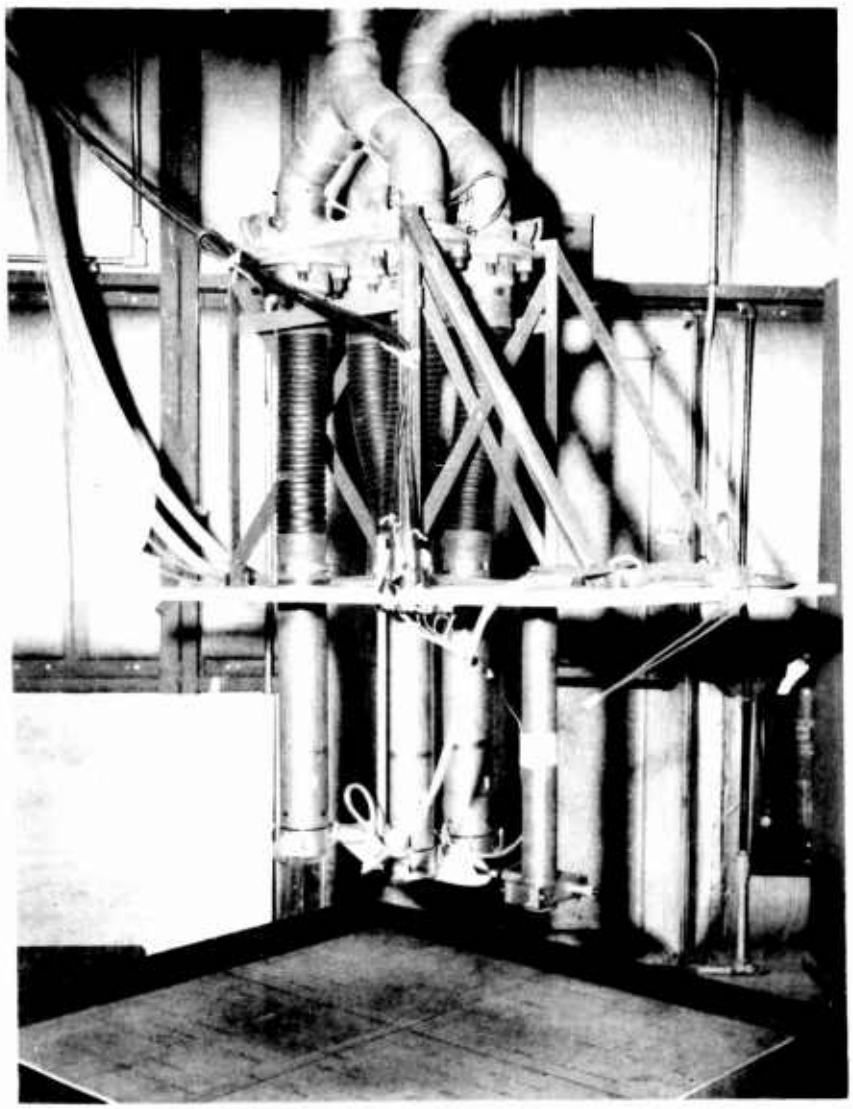

Figure 12. Model X-22A Ground Effects Model

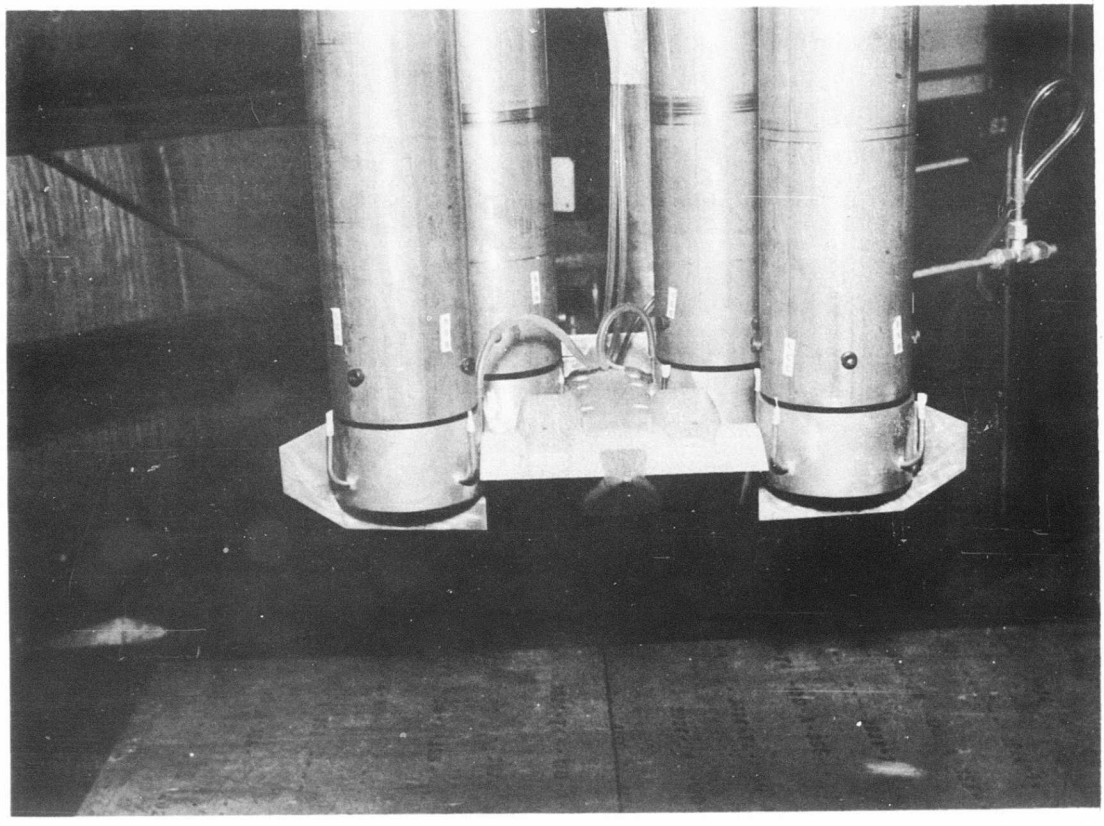

Figure 13. Model X-22A Ground Effects Model

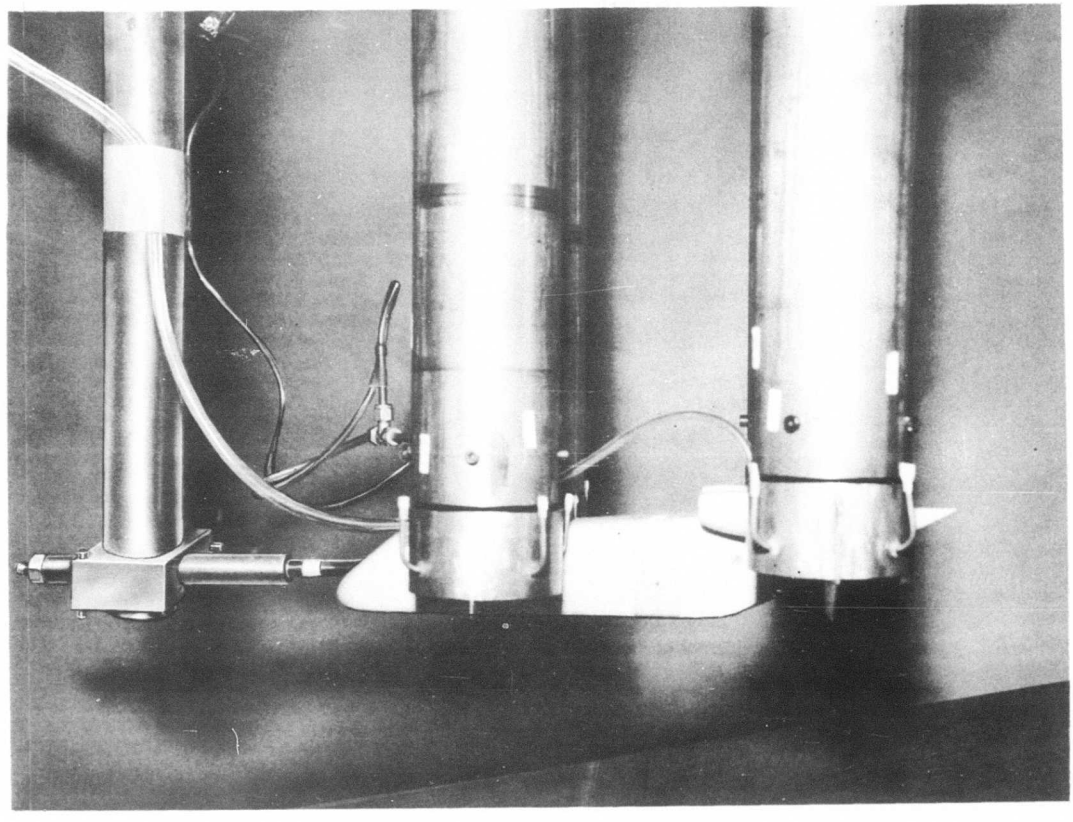

Figure 14. Model K-22A Ground Effects Model

V. MOCKUP

A. COCKPIT MOCKUP (See Figures 15-17).

The design of the manual seat adjustment has been completed and seat rails have been installed. All instruments have been selected for the main instrument panel and have been mounted on bezels.

The following items are released and being installed:

Control Stick Grip
Pilot Arm Rest
Emergency Canopy Egress Mechanism
Windshield Wiper Installation
Variable Stability System Console Panels
Glare Shield for Main Instrument Panel

The mockup is progressing in advance of schedule. A mockup brochure is in preparation. Tentative review dates are planned for 17-18 September at Bell Aerosystems Main Plant Facility, Wheatfield, N. Y. Formal Review Notice will be made at a later date.

B. HUMAN FACTORS MOCKUP

Activity on this economical three-dimensional mockup has been to resolve areas of equipment location and to relieve any congestion. It will continue in this function during this early design and layout phase. (Also see Human Factors Section III.D.1)

Figure 15. Model X-22A Cockpit Mockup

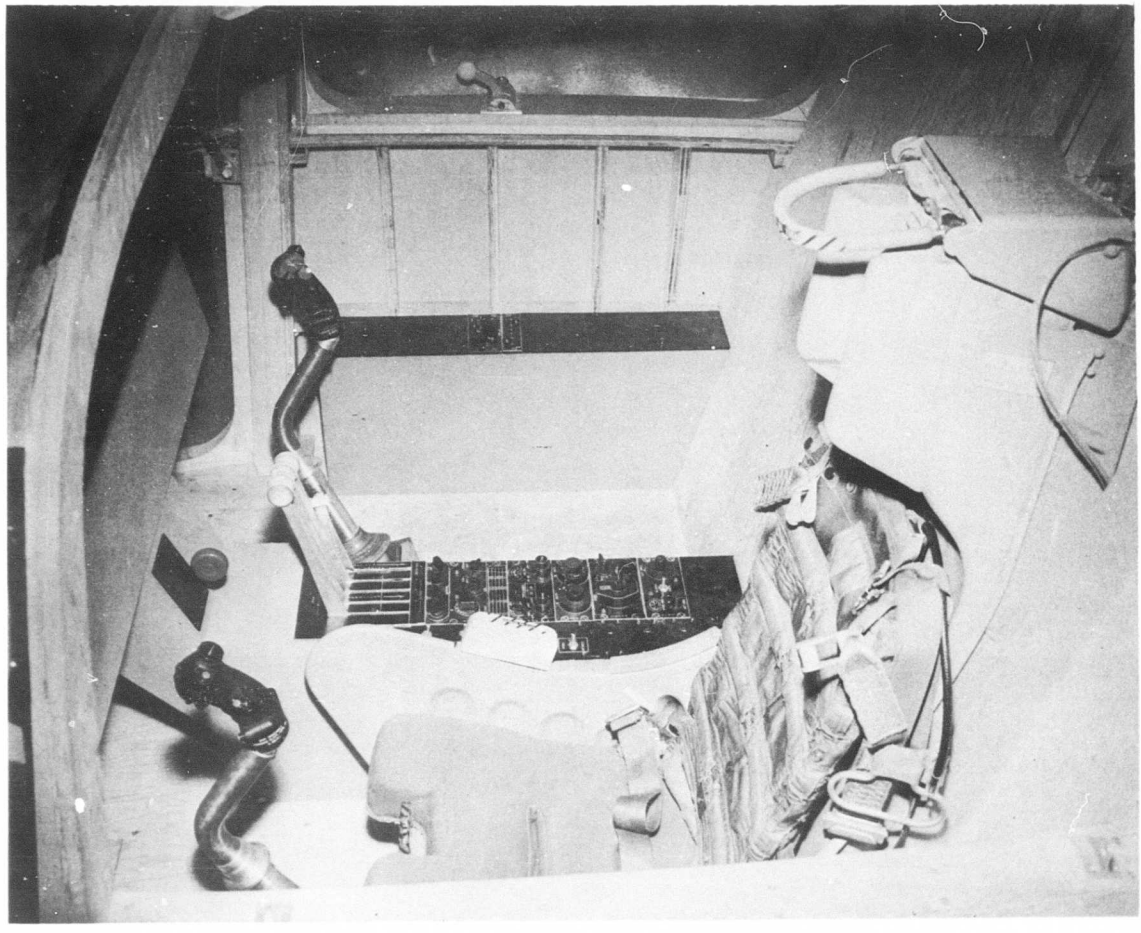

Figure 16. Model X-22A Cockpit Mockup

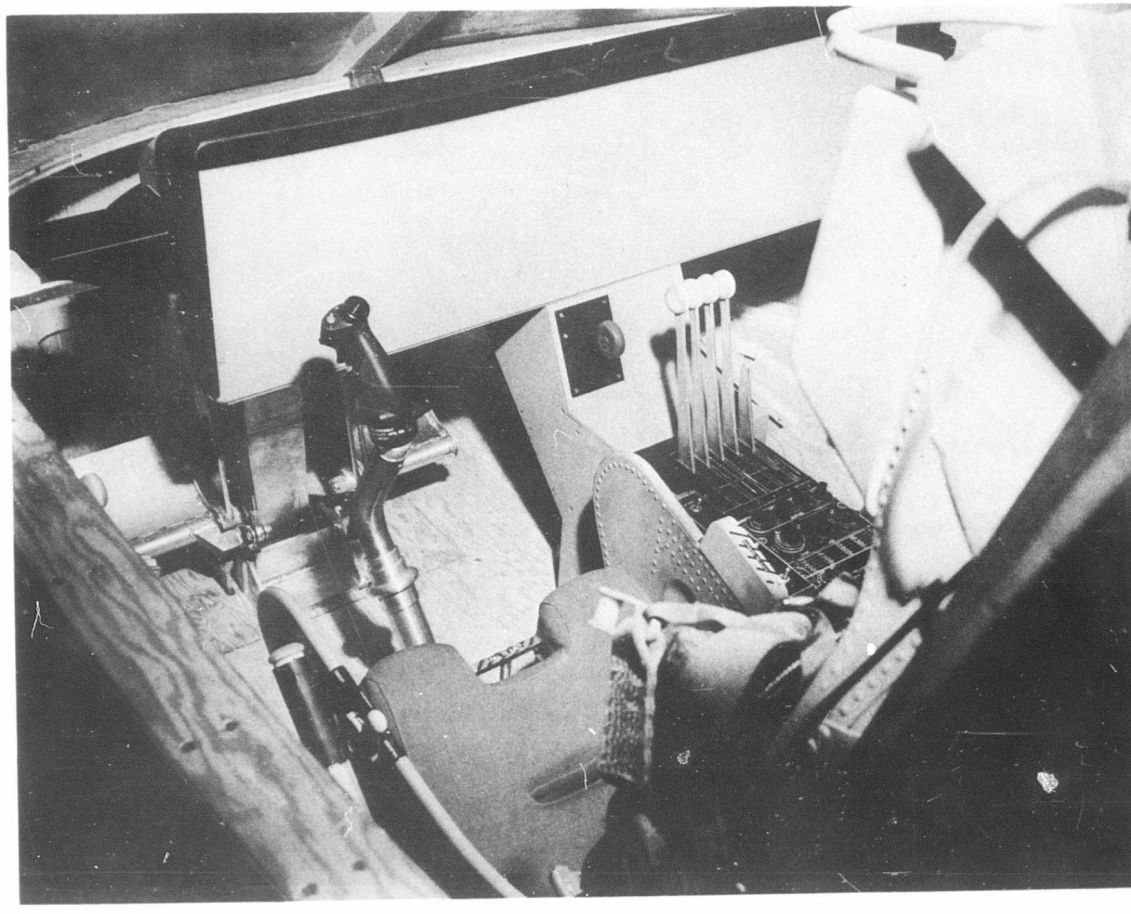

Figure 17. Model X-22A Cockpit Mockup

VI. GENERAL

A. TRIPS AND VISITS

1. Trips

Date	Destination	Purpose
6-4-63	NASA-Langley	Duct Tests
6-7-63	Dynamic Devices	1/7 Scale Flutter Model
6-10-63	NASA-Langley	1/5 Scale Powered Model
6-10-63	Steel Products	Transmission Design
6-12-63	DTMB	1/3 Scale Duct Model
6-17-63	DTMB	1/6 Scale Unpowered Model
6-17-63	NASA-Langley	1/5 Scale Powered Model
6-19-63	Washington	Kellet Program
6-19-63	Hamilton-Standard	Propeller Review
6-22-63	NASA-Ames	Full Scale Duct Program
6-24-63	York Gears Ltd.	Right Angle Gear Box
6-25-63	Dynamic Devices	1/7 Scale Flutter Model
6-26-63	DTMB	1/5 Powered Scale Model
6-26-63	BuWeps	Flight Control and Ejection Seat
6-26-63	DTMB	1/5 Powered Scale Model

2. Visitors

6/3/63	Bendix Corp. South Bend, Inc.	Constant speed drive
6/5/63	Steel Products Co. Springfield, Ohio	Transmission/Gearbox Data
6/5/63	Lycoming	Landing gear system
6/12/63	Aeroquip Corp. Jackson, Michigan	Hydraulic system components
6/13/63	Hamilton Standard Hartford, Conn.	Propeller Data
6/17/63	Cornell Labs. Buffalo, N. Y.	Variable Stability System
6/17/63	Kellogg Division American Brake Shoe Oxnard, Calif.	Hydraulic System Components
6/18-19/63	BuWeps and FLTREADREPLANT	Project Status
6/27/63	Wiggins Connectors Los Angeles, Calif.	Hydraulic System Components
6/28/63	Kellett Corp. Willow Grove, Pa.	Ground Impingement Tests
6/28/63	Hamilton Standard Hartford, Conn.	Propeller Data
6/28/63	Steel Products Springfield, Ohio	Transmission/Gearbox Data
6/28/63	USAF, TAC Hdqtrs. Langley Field.	X-22A Program
6/28/63	USN/USMC Hdqtrs. Washington, D. C.	X-22A Program Status

B. CORRESPONDENCE AND REPORTS SUBMITTED DURING JUNE 1963

BAC Letter No.	Date Submitted	To	Subject	Reason
274	6/3	BuWeps - NPAF-35	Deviation from MIL-C-8779(WEP)	Approval
275	6/4	BuWeps Rep - E. Longwell	Premium Over-time	Information
286	6/5	BuWeps - RA-443	Elevon Effective-ness Model	Information
288	6/6	BuWeps - RA-443	Characteristic Summary (Rev. #1)	Information
289	6/6	BuWeps - RA-443	Propeller Group Dwg.	Approval
292	6/11	BuWeps - RA-443	Wing Group Drawing	Approval
293	6/11	BuWeps - RA-443	Tail Group Drawings	Approval
294	6/12	BuWeps - RA-443	Propulsion System Dwgs.	Information
295	6/12	BuWeps - RA-443	Body Group Drawing	Approval
296	6/12	BuWeps - NPAF-35	Schedules for Del. Items	Information
297	6/13	BuWeps - RA-443	PERT Reports	Information
298	6/13	BuWeps - RA-443	Weapon Sys. Master Plan - Monthly Status	Information
299	6/13	BuWeps - RA-443	Rev. to SD-550-1 (Ground Clearance)	Approval
300	6/14	BuWeps - RA-443	Monthly Progress Rept. No. 6	Information

BAC Letter No.	Date Submitted	To	Subject	Reason
301	6/17	BuWeps - RA-443	Trans-Application of Protective Finishes for Model X-22A Aircraft	Approval
302	6/17	BuWeps - NPAF-3	Revision to SD-550-1 (Hyd. Sys.)	Approval
303	6/17	BuWeps - RA-443	Propulsion System Dwg.	Information
304	6/17	BuWeps - RA-443	Propulsion System Dwg.	Information
305	6/17	NATC-Lt. W. Salo	Re-Submittal of Letters	Information
306	6/19	BuWeps Rep - E. Longwell	Premium Over-time	Information
307	6/20	BuWeps - RA-443	Landing Gear Drawing	Approval
308	6/20	BuWeps - RA-443	Performance Data (Revision)	Approval
309	6/24	BuWeps - RA-443	Wind Tunnel Test Facilities Delays	Information
310	6/24	BuWeps - RA-443	PERT Interim Report	Information
311	6/25	BuWeps - NPAF-35	X-22A Research Aircraft - Funding	Information
312	6/25	NASA-Ames	General Arrange-ment Dwg.	Information
313	6/26	BuWeps - RA-443	Vacation Period - BAC (1963)	Information
314	6/26	BuWeps - RA-443	Prop.Sys. Dwg.	Information

BAC Letter No.	Date Submitted	To	Subject	Reason
315	6/27	BuWeps-NPAF-35	Rev. to SD-550-1 (Remote Oiling)	Approval
316	6/27	BuWeps-NPAF-35	Rev. to SD-550-1 (Elevon Balancing)	Approval
317	6/28	BuWeps-RRMA	Summary Report Materials	Information
318	6/28	BuWeps-RA-443	Weapon System Master Plan (Revision)	Approval
319	6/28	BuWeps-RA-443	R-2 Revisions to SD-550-1	Information
320	6/28	BuWeps-NPAF-35	Revision to Addendum No. 162 (Mockup)	Approval

C. OPEN ITEMS (Submitted at least 30 days prior to end of June)

1. BuWeps and BuWeps Rep

BAC Letter No.	Subject	Date Submitted	Required Approval Date
28	Basic Aerodynamic Data Report - Revision (2127-917002)	1-24-63	**
31	Human Factors Data Report (2127-919001)	1-29-63	**
75	Vibration Program Report (2127-932001)	2-27-63	**

** BAC has scheduled a 30 day interval for approval by BuWeps of each of these submittals after BuWeps Rep. endorsement.

BAC Letter No.	Subject	Date Submitted	Required Approval Date
84	Revision to SD-550-1 Para 3.1.2.1 (Endurance Requirement)	3-1-63	*
120	Preliminary Wiring Diagrams - Electrical System	3-28-63	**
157	Defense Materials System (DMS) Self-Authorization Approval	4-18-63	**
171	Revision to SD-550-1 (Pilot's Cockpit)	4-26-63	*
174	Revision to Addendum No. 162 (Test Program)	5-1-63	**
178	Aerodynamic Stability and Control and Flying Qualities Report	5-2-63	**
179	Performance Data (Revision)	5-3-63	**
181	Fatigue Criteria Report	5-6-63	**
214	Wind Tunnel Selection - 1/7 Complete Airframe	5-22-63	**
215	Engine Delivery Requirements	5-23-63	**
216	Revision to SD-550-1 (Electrical Equipment)	5-23-63	**
257	Revision to SD-550-1 (Propeller Brake System)	5-31-63	**

* Commander Braun verbally advised BAC on April 30, 1963 that a letter is forthcoming which will describe method of requesting changes.

** BAC has scheduled a 30 day interval for approval by BuWeps of each of these submittals after BuWeps Rep. endorsement.

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